2. Patent Claims

1. An arrangement for increasing the depth discrimination of optically imaging systems by projection of a periodic structure in the object, detection of N, N>=3 structured images of the object with phase angles $\varphi_n = n\frac{2\pi}{N}$, $n = 0..N-1$ of the projected structure, and generation of optical sections by evaluation of the images with the N different phase angles by Equation 5b.

2. An arrangement for increasing the depth discrimination of optically imaging systems by projection of a periodic structure in the object, detection of three structured images of the object with the three phase angles 0°, 120°, 240° of the projected structure, and generation of optical sections by evaluation of the three images with different phases by Equation 10.

3. An arrangement for increasing the depth discrimination of optically imaging systems by projection of a periodic structure in the object, detection of four structured images of the object with the four phase angles 0°, 90°, 180°, 270° of the projected structure, and generation of optical sections by evaluation of the four images with different phases by Equation 11.

4. An arrangement for increasing the depth discrimination of optically imaging systems by projection of a periodic structure in the object, detection of N, N>=3 structured images of the object with phase angles $\varphi_n = n\frac{2\pi}{N}$, $n = 0..N-1$ of the projected structure, and calculation of structure-free images by Equation 7, wherein the image of the object calculated in this way does not have increased depth discrimination.

5. An arrangement for increasing the depth discrimination of optically imaging systems by projection of a periodic structure in the object, detection of two structured images of the object with phase angles of 0° and 180°,

and calculation of a synthetic image by Equation 12c, wherein the image of the object calculated in this way does not have increased depth discrimination.

6. An arrangement for increasing the depth discrimination of optically imaging systems by projection of a periodic structure in the object, by projection of a periodic structure in the object, detection of four structured images of the object with phase angles of 0°, 90°, 180°, 270°, and calculation of a synthetic image by Equation 7, wherein the image of the object calculated in this way does not have increased depth discrimination.

7. An arrangement for increasing the depth discrimination of optically imaging systems by projection of a periodic structure in the object, by projection of a periodic structure in the object, detection of three structured images of the object with phase angles of 0°, 120° and 240°, and calculation of a synthetic image by Equation 12a, wherein the image of the object calculated in this way does not have increased depth discrimination.

8. An arrangement for increasing the depth discrimination of optically imaging systems by projection of a periodic structure in the object, by projection of a periodic structure in the object, detection of four structured images of the object with phase angles of 0°, 90°, 180°, 270°, and calculation of a synthetic image by Equation 12b, wherein the image of the object calculated in this way does not have increased depth discrimination.

9. An arrangement for increasing the depth discrimination of optically imaging systems according to one of claims 1 to 9, wherein the spatial phase of the projected structure is adjusted by a plane-parallel plate which is rotatable about an axis perpendicular to the optical axis.

10. An arrangement according to claim 9, wherein the spatial phase is adjusted by a galvanometer scanner.

11. An arrangement according to one of claims 1 to 10, wherein the structure can be move in axial direction in addition.

12. An arrangement according to one of claims 1 to 10, wherein the illumination-side tube lens can be moved in axial direction in addition.

13. An arrangement according to claims 11 – 12 with motor-actuated movement.

14. An arrangement according to claim 11 with motor-actuated movement corresponding to Figures 7a, 7b.

15. An arrangement according to claim 11 with motor-actuated movement of an optical wedge corresponding to Figure 9.

16. An arrangement according to claims 1 to 15 in combination with the measurement of the light intensity by a light-sensitive detector.

17. An arrangement according to claim 16 in combination with the measurement of the light intensity by a light-sensitive detector, wherein a photodiode is used as light-sensitive detector.

18. An arrangement according to claims 16, 17, wherein the digitized signal of the light-sensitive detector is used for scaling the image brightness.

19. An arrangement according to claim 18, wherein the digitized signal of the light-sensitive detector is used for scaling the image brightness using Equation 17.

20. An arrangement according to one of claims 1 to 19, wherein the calculation of depth-discriminated images is obtained by solving the system of equations given by Equations 20, 21 and 22.

Further subclaims according to one of the preceding claims:

Use of an automatic shutter

Use of a shutter according to Figure 5

Minimizing artifacts through the use of averaging according to Equation 24

Implementation of a module with two positions according to Figure 8

Coding of the grating with a bar code for automatic detection of the grating

Coding of the grading with a stripe code for automatic detection of the grating

Exchangeable gratings

Use in all linear interactions

Use in microscopy

Use in incident light microscopy

Use in incident brightfield microscopy

Use in transmitted light microscopy

Use in incident fluorescence microscopy